CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Bitumen/2013-14 29.03.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE
AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
SAMPLE I/D	Roads in Ward No. 12
DATE OF TESTING	29.03.2014

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	474.5
3. Weight of Asphalt and Mineral matter Extracted, g	26	25.5
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	26	25.50
7. Bitumen content in %	5.20	5.10
8. Average	**5.15**	

GRADATION AFTER EXTRACTION

TABLE - 1

SIEVE SIZE	Percent Passing, %		JOBMIX
mm	Sample 1	Sample 2	Gradation
19	100.00	100.00	100
13.2	93.43	85.55	79-100
9.5	79.45	78.23	70-88
4.75	66.32	65.45	53-71
2.36	51.26	53.46	42-58
1.18	43.12	42.75	34-48
0.6	35.65	36.30	26-38
0.3	24.85	25.87	18-28
0.15	16.96	17.85	12-20
0.075	6.13	7.26	4-10

Note:

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AE12

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಶೆಟ್ಟಿಹಳ್ಳಿ ಉಪವಿಭಾಗ, ದಾಸರಹಳ್ಳಿ ವಲಯ
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ಶಕ್ತಿ ಗಣಪತಿ ನಗರ, ಬೆಂಗಳೂರು.

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4th Block, Shakthiganapathinagara,
Basaveshwaranagar,
Bangalore-560079.

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Bitumen/2013-14 28.03.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE
AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
SAMPLE I/D	Roads in Ward No. 12
DATE OF TESTING	28.03.2014

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	473	474.5
3. Weight of Asphalt and Mineral matter Extracted, g	27	25.5
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	27	25.50
7. Bitumen content in %	5.40	5.10
8. Average	**5.25**	

GRADATION AFTER EXTRACTION

TABLE - 1

SIEVE SIZE	Percent Passing, %		JOBMIX
mm	Sample 1	Sample 2	Gradation
19	100.00	100.00	100
13.2	94.25	95.46	79-100
9.5	78.46	79.85	70-88
4.75	65.32	66.23	53-71
2.36	52.19	51.48	42-58
1.18	41.75	42.19	34-48
0.6	36.28	35.28	26-38
0.3	25.37	26.53	18-28
0.15	15.83	16.82	12-20
0.075	5.29	6.48	4-10

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AE 12

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ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
ಎಸ್.ಎಲ್.ಬಿ. ಆಸ್ಪತ್ರೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು.

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4th Block, Shakthi Ganapathinagara,
Basaveshwaranagar,
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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Agg/2013-14 28.03.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	28.03.2014

Total Weight of Sample: **5275** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	592	11.22	11.22	88.78	79 - 100	
9.5	495	9.38	20.61	79.39	70 - 88	
4.75	784	14.86	35.47	64.53	53 - 71	
2.36	595	11.28	46.75	53.25	42 - 58	
1.18	429	8.13	54.88	45.12	34 - 48	
0.600	642	12.17	67.05	32.95	26 - 38	
0.300	512	9.71	76.76	23.24	18 - 28	
0.150	415	7.87	84.63	15.37	12 - 20	
0.075	465	8.82	93.44	6.56	4 - 10	

Total Weight of Sample: **5350** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	568	10.62	10.62	89.38	79 - 100	
9.5	512	9.57	20.19	79.81	70 - 88	
4.75	798	14.92	35.10	64.90	53 - 71	
2.36	615	11.50	46.60	53.40	42 - 58	
1.18	478	8.93	55.53	44.47	34 - 48	
0.600	629	11.76	67.29	32.71	26 - 38	
0.300	485	9.07	76.36	23.64	18 - 28	
0.150	472	8.82	85.18	14.82	12 - 20	
0.075	486	9.08	94.26	5.74	4 - 10	

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ಎಸ್.ಎಂ ರಸ್ತೆ, ರವೀಂದ್ರನಗರ ಪಾಲಿಕೆ

Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

M/s. Civil-Tech Consultants & Engineers
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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Agg/2013-14

29.03.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	29.03.2014

Total Weight of Sample: **5150** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	525	10.19	10.19	89.81	79 - 100	
9.5	463	8.99	19.18	80.82	70 - 88	
4.75	842	16.35	35.53	64.47	53 - 71	
2.36	569	11.05	46.58	53.42	42 - 58	
1.18	468	9.09	55.67	44.33	34 - 48	
0.600	637	12.37	68.04	31.96	26 - 38	
0.300	461	8.95	76.99	23.01	18 - 28	
0.150	405	7.86	84.85	15.15	12 - 20	
0.075	470	9.13	93.98	6.02	4 - 10	

Total Weight of Sample: **5170** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	583	11.28	11.28	88.72	79 - 100	
9.5	478	9.25	20.52	79.48	70 - 88	
4.75	732	14.16	34.68	65.32	53 - 71	
2.36	585	11.32	46.00	54.00	42 - 58	
1.18	446	8.63	54.62	45.38	34 - 48	
0.600	635	12.28	66.91	33.09	26 - 38	
0.300	483	9.34	76.25	23.75	18 - 28	
0.150	424	8.20	84.45	15.55	12 - 20	
0.075	456	8.82	93.27	6.73	4 - 10	

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#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

M/s. Civil-Tech Consultants & Engineers
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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Stability/2013-14 28.03.2014

TEST REPORT ON STABILITY OF MIX

Client	:	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
Name of the work	:	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference	:	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of testing	:	28.03.2014

The results of the tests conducted on the bituminous concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	10.65	9.70	9 Kn (min)
2	Marshal flow, mm	2.80	3.25	2 – 4mm
3	Percent air voids in Mineral Aggregate	13.35	14.20	13 – 15
4	Voids in Compacted Mix	4.80	5.45	3 – 6
5	Percent Voids filled with Bitumen	72.95	73.50	65 - 75
6	Density, g/cc	2.26	2.27	--

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29.03.2014

TEST REPORT ON STABILITY OF MIX

Client	:	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
Name of the work	:	Improvements to RCC Drain and Concrete Roads in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.
Reference	:	BBMP/DZ/AEE/SSD/PR/2013-14 Dated: 08.01.2014
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of testing	:	29.03.2014

The results of the tests conducted on the bituminous concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.55	10.40	9 Kn (min)
2	Marshal flow, mm	3.70	4.35	2 – 4mm
3	Percent air voids in Mineral Aggregate	14.45	13.25	13 – 15
4	Voids in Compacted Mix	5.30	4.65	3 – 6
5	Percent Voids filled with Bitumen	71.25	72.30	65 - 75
6	Density, g/cc	2.27	2.26	--

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ಬೆಂಗಳೂರು ಪೂರ್ವ, ರಾಜರಾಜೇಶ್ವರಿನಗರ, ಬೆಂಗಳೂರು.

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com